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Moderators' Report/ Principal Moderator Feedback

Summer 2013

GCE Design & Technology (6RM04)
Paper 01 Commercial Design

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Summer 2013
Publications Code UA035735

Introduction

The 6RM04 course in RMT focuses on a synoptic task of a student's own choice and offers individuals the opportunity to demonstrate the skills and competencies assimilated during the entirety of the course so far.

Some students produced excellent, high quality work which was very challenging and 'risky' when considering whether it could be manufactured or not, but the majority opted for straightforward tasks that were done well but lacked the challenge of uncertainty. Moderators reported that they were able to agree more centre marks this year than had been the case recently, which is encouraging, although it is now four years since this course was first assessed, so the expectation is that centres should have a thorough understanding of requirements and standards by now.

In this course students are required to employ a commercial approach to their work at this level and act as a professional designer might when working for a client or small user group. To this end, client input should be sought and any design compromises as a result of discussion should be recorded to show how design decisions were influenced. The results of client input should be seen during Research and analysis; Specification; Design; Review; Development and Testing and evaluation.

Research and analysis

Not many students scored full marks in this section because, despite often producing copious amounts of research, they failed to be selective or focus closely on the problem in hand. Virtually all students identified a client or user group, but many were not 'real', being impersonated by the student designer, which resulted in superficial and subjective comments which were almost always complimentary. Despite identifying a client, many students never referred to them again until the final evaluation of the finished product. Some clients did not 'appear' until several pages into the design folder. There were however some excellent examples of a genuine relationship between the client and the student with real involvement, but this was the exception rather than the rule.

Significant numbers of students carried out client interviews but failed to establish appropriate design needs, while others gathered information from an interview, then produced a questionnaire to circulate widely, which was pointless as all necessary information should come from the client or small user group for whom the designer is working.

Many students presented lots of pages of research that were generic and unguided, usually as a result of not establishing succinct design needs, determined through a detailed client or user group interview at the outset. It was not unusual to see 15 – 20 pages of research.

Research into processes and materials serves little purpose at this point, as no design decisions have yet been made; it would be more appropriate if students were to research such topics during designing and development, where relevance would be strong and the range of required materials and processes narrow.

Existing product analysis was undertaken by almost all students, with varying amounts of success. In the best work, students gathered useful information to use in designing regarding materials, processes, finishes, ergonomics mechanical details etc, while others made superficial comments about aesthetics and cost, which provided very little useful information.

Overall, research was better focused and more concise for many students this year, but hardly any drew conclusions to feed directly into the specification. If research is not used to underpin and guide specification writing it becomes a pointless activity

Product specification

The starting point for a strong specification should be at the point of summary of research where key points have been identified as essential to be included. The student should present evidence of having consulted with the client to ensure that the specification points are mutually agreeable and that they meet the needs identified earlier.

Not many students scored high marks in this section. Many did not use the specification headings recommended in the subject specification, of purpose; form; function; user requirements; performance requirements; materials etc, which often led to muddled specifications and produced few measurable points. Using the recommended headings allows students to organise their thoughts and to avoid rambling and repetitive statements.

It is extremely important that product specifications contain measurable points that can be used to guide designing and to test and evaluate the finished product. Final testing should consider the performance of a product, so it is important that some specification points focus on succinct technical aspects of performance wherever possible. With this in mind students should pay particular attention to the headings 'Performance requirements' and 'User requirements', as this is where most technical and measurable aspects of a product lie. As already stated, it is crucial to success in several assessment criteria that students produce a strong product specification, so teachers should consider offering strong advice and guidance in this regard when discussing projects at their outset.

More students justified their specification points this year, but many did not do this effectively, while few made the link to information gathered from research. Reference to sustainability was generally weak and poorly addressed.

Design and development – Design

Moderators reported that this section was stronger this year than last, with greater evidence of centres encouraging students to show progression in their work; annotation on materials and processes was also stronger in many cases.

A full range of abilities was on show and a full range of outcomes evident. Some highly creative and technically sophisticated work was seen, as well as low level responses which did not meet the expectations of this course.

Students who were in control of their work sought true client feedback at this point, but many did not consult at all, ignoring the commercial approach to

designing. Many students included reference to a client in the third party, but this was often superficial and unauthentic. Client feedback at this point should be encouraged and this should be based on the design needs already established.

Many designs were technically undetailed and offered little graphical exploration of design sub-systems, an aspect of designing expected at A2 level. Ideas and their alternatives were sometimes no more than styling exercises, which disappointingly were often over-rewarded where it was obvious that the evidence presented did not deserve the credit given.

Whilst overall, designing was stronger, some students felt they could hit the marks simply by producing minimal design activity and endless annotation. Designing is a balance and if an idea is not a worthy solution at a conceptual level there is a limit to how well it can be dressed up with annotation.

Design and development – Review

Review was usually carried out as a stand-alone task as intended but was sometimes assessed by looking at comments made throughout the design section.

Review was generally done with reference back to the specification and client but very few students actually used the resulting information to make value judgements in comparing the relative merits of each design to decide which one, or sub-systems of others would be developed. For many, the two sections did not appear to be directly related.

The vast majority of students have moved away from numerical scoring systems to a verbal commentary but many repetitive statements are still in evidence. As ever, there was some excellent work in evidence, but for many students the review lacked conviction and direction as their specifications lacked the measurable criteria to allow objective judgements to be made.

If the client made an appearance in the design section they would not usually appear in review and vice versa and often client/user group input was entered as second hand comments and did not feel authentic.

Where it was considered, sustainability was often superficial and non-project specific.

Design and development – Develop

Some excellent work was in evidence in this section from more able students, with well structured development activity in evidence allowing the design to evolve as well as specifying the technical details for construction.

However, ‘Develop’ still causes students difficulties in understanding, as they fail to grasp the concept that development means change and refinement of an initial idea into a final design proposal based on the results of review and client feedback. Too often, students appeared content to merely explain an initial idea in greater technical detail rather than moving it on through continued design input. Often changes that were made to an initial idea were simple and cosmetic

and did not move the design forward. For many, development simply focused on how the product was to be made which was disappointing to see.

Modelling was in common use and there was lots of evidence of expert use of 3D CAD being used to develop an idea and then to feed into the final design proposal.

There seemed little point to some models however, other than fulfilling an assessment requirement. It is notable that a significant number of students produced physical models that were so badly made that they could not possibly have informed the design process in any useful way. Physical modelling needs to be planned and undertaken with a sense of purpose if it is to inform the development phase; modelling must also be of suitable quality if it is to provide a meaningful route forward. Client input at this point was often sparse or superficial.

Design and development – Communicate

As was the case last year, most students achieved significant marks in this section and some displayed excellent standards of all-round communication skills. The use of CAD was generally of excellent quality, but dimensioning of 2D CAD orthographic drawings tended to be problematic. Where such drawings were generated within the CAD software many dimensions were inappropriate and of no practical value to a third party intending to manufacture the design proposal. A number of students insisted on using CAD as a tool for initial designs, which was disappointing to see as it removed the spontaneity and detail needed when designing ideas.

Some centres credited working drawings as part of planning, but they are firmly part of design development.

A common failing in this section was the lack of detailed information offered to enable third party construction of the intended product. It appeared that many teachers did not appreciate that enough information had to be included to enable third party manufactured and only assessed the expertise in using communication techniques.

Planning

Most centres understand what is expected in this section and can address it well and all students were able to present a flowchart, table or Gantt chart showing an appropriate sequence of operations for the manufacture of their product. Hardly any scored maximum marks however, because statements were often undetailed and quality control descriptions were frequently questions. Statements such as ‘check dimensions are correct’ or ‘is the bend at the right angle’ are worthless as quality checks as they convey no information regarding how checks would be carried out. QC checks should be specified as to what they are and described to say how they would be carried out.

Some students merged their planning with their diary of manufacture, which is ill advised and can lead to confusion as to what is planning and what is retrospective commentary. Only a few students used retrospective statements in their planning, but such an error can lead to the loss of all marks in this

section. The simple statements “I will” compared to “I did” can mean the difference between a plan and a retrospective description of events past.

Some students offered units of time in weeks, days, dates and lessons, but failed to qualify how log in real-time each of these were.

Making – Use of tools and equipment

Some excellent work was in evidence in this section and some superb and comprehensive manufacturing diaries were produced, consisting of clear photographs and informative annotation to explain what was happening in the pictures. Although a display of several images is not a formal assessment requirement, it contributes greatly towards moderators being able to agree marks, especially where high credit has been awarded.

CAM was commonly used but it was pleasing to note that the vast majority of students used it appropriately, leaving opportunities to demonstrate other skills and competencies in their work. Only a few students showed an over-reliance on CAM in their practical work.

There are still a significant number of students who submitted work that, despite being very well made and finished, required only low to medium level skills to make. This would be perfectly acceptable were it not for the insistence of some teachers in awarding high marks where they cannot be agreed and do not stack up against other students who have demonstrated much higher level skills for the same reward.

Making – Quality

As has been the case in general in past examination series, this section was well assessed with some excellent work in evidence. There was a good range of quality items made, but in some cases there was limited scope for students to demonstrate high quality outcomes as the solutions were quite simple. As previously mentioned, most photographic evidence was of high quality, but there was some which was poor, making it difficult to see where marks for ‘quality’ were being awarded.

Marks are gained here for the quality of the completed work and its component parts, how well they are assembled into a finished product, whether it functions as it is meant to, whether it matches the final design proposal and whether it is appropriate to expected A2 levels of response. Although excellent work was seen, some products lacked the scope and potential to allow students to demonstrate their abilities. More ambition and risk taking would be of benefit to students in targeting higher marks.

Not many students justified their choice of materials for manufacture, which could have been done easily through simple annotation of photographs or in planning.

Making – Complexity / level of demand

Challenging and demanding work was in evidence from some students who had taken on manufacturing tasks with the risk of failing or achieving their potential because of the high level of demand inherent in the work and time available, and

these individuals are to be congratulated for working outside their comfort zones.

On the other hand, there was evidence of poor project choices made by students, which made it difficult to achieve high marks here because a limited range of skills was required in a simplistic project.

At the outset of a project teachers need to intervene and advise students to ensure that the intended product is appropriate to A2 levels of demand and is challenging enough to access higher marks, avoiding simplistic and repetitive skills and processes.

Testing and evaluation

This section was more comprehensively addressed than in past years but there was still evidence of the work being rushed, probably because students ran out of time.

For a good number of students, a lack of measurable and technical criteria in the product specification made testing and evaluation difficult to undertake in a meaningful way. Few students offered planned testing, where they described and justified tests to check measurable specification points. For many, testing consisted of a series pictures with superficial annotation.

For the majority of students, client input was cursory, when it should have been full-on, providing extensive feedback against design needs and specification points. This weakness reflected the superficial nature of their involvement throughout the design and make task.

Where third party evaluation was in evidence, often included as an afterthought, it was usually congratulatory and not a reflection of having considered measurable specification points.

Many students interpreted the need to suggest modifications as an opportunity to record modifications they made during manufacture, which is inappropriate; modifications should focus on improving the performance and quality of the finished product and suggestions should be as a result of testing, evaluation and client/user feedback.

Where students addressed the LCA it was often done well, but in many instances it was generic and related almost wholly to sustainability. Many students missed LCA out completely.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

http://www.edexcel.com/iwant to/Pages/grade-boundaries.aspx

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